Developing a Hearing Standard

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Effective communication is essential for many jobs

- Public safety jobs
  - Police officers
  - Security guards
  - Firefighters
- Explosive Handlers and Drivers
- Motor Vehicle Operators

Police officers (GS-083) Security Guard (GS-085) Correctional Officers (GS-007)

- Unaided auditory acuity levels in each ear should not exceed the following values:
- 30 dB HL at 500, 1000, or 2000 Hz.
- 45 dB HL at 3000 Hz.
- 60 dB HL at 4000 Hz.
- Refer for fitness for duty evaluation
- Hearing loss is disqualifying *in and of itself* when values at 500, 1000, or 2000 Hz. exceed 50 dB HL
- COMNAVMED ltr 6264 Ser 242/80418035 of 10 Jun 88

Firefighters

- No loss greater than 30 dB in the *unaided worst ear* at 500, 1000, and 2000 Hz.—Must do fitness for duty evaluation
- Use of hearing aids is not permitted in this job series

Federal Personnel Manual
NFPA Standards

Motor Vehicle Operators

- Average hearing loss in the *better* ear must be no greater than 40 dB at 500, 1000, and 2000 Hz. This requirement is often waived if the individual has demonstrated an adequate safe driving record.

- Federal Personnel Manual

Explosive Handlers and Drivers

- Hearing loss *in either ear* averaging greater than 40 dB at 500, 1000, and 2000 Hz *with or without a hearing aid* is disqualifying

- Manual of the Medical Department

Individuals must be able to:

- Hear
- Localize
- Discriminate
- Recognize
- Understand

- A variety of speech and environmental sounds
- In a variety of acoustic environments

Listening Environments:

- Relative quiet of the office environment
- Cacophony of engine or airport noise

Foreign and regional accents and other language barriers may further complicate the situation

Applicant/Incumbent must have the physical capability to perform the job in a safe and effective manner in a wide variety of situations and environments

must not be of sufficient degree to interfere with the safe performance of the duties and responsibilities of the job, nor should it shift the strategic advantage from the officer to his adversary

otherwise qualified candidates with functionally inconsequential hearing deficits to reasonable employment opportunities within the guidelines outlined in Title I of the ADA

Development of a Standard

- Must reflect the demands of the job
- Must have a sound basis in science
- Must be based on typical clinical measures
- Must be applied in a standardized fashion

Standard must reflect demands of the job

- In- depth job analysis
- Job description and other relevant documents
- Focus groups

Focus groups

- Rate job functions by
  - Frequency of occurrence
  - Importance of having ability to perform
- How often each occurs in a variety of acoustic environments ranging from very quiet to very loud noise
- Identify essential job functions
- Provide anecdotal information

Speech Comprehension

- Face-to-Face
- Telephone
- Radio transmissions
- In presence but without visual cues (driving, in the dark)

Sound Detection

- Hear sounds that require investigation

Sound Discrimination

- Distinguish type of sound heard
- Hear differences in sounds, for example, tapping on containers

Sound Localization

- Determine location
- Direction and distance
- Moving or stationary (source as well as listener)

Acoustic Environments

- Silence: Quiet, virtually no background noise
- Moderate noise: Muffled street sounds, running car engine, normal conversation
- Loud noise: Honking horns, nearby street/building construction, motorcycle engine, noisy restaurant, nearby crowd of people
- Very loud noise: Sirens, nearby helicopter, screaming mob, gunfire

Field Observations

- Actual performance of duties or simulation
- Noise measurements in a variety of situations
- Reverberation
- Acoustic characteristics of any common devices used, e.g., radios, kel listening devices, telephone intercepts, etc.

Test selection

- Pure tone audiogram: Determines sensitivity
- SRT: Speech detection
- Speech Recognition: In quiet and in noise
  - Under headphones or in sound field
  - Monaural or binaural
  - Recorded or live voice

Speech in noise in sound field

- Not standardized
  - Distance from speaker
  - Type of speech stimuli
    - Nonsense syllables
    - Spondee words
    - Monosyllabic words
    - Sentences
    - Synthetic sentences

Speech in noise in sound field (con't)

- Type of competing noise
  - Speech noise
  - Narrow band noise
  - White noise
  - Competing message such as cafeteria babble
- Environment
  - Reverberant
  - Non-reverberant

Speech in noise in sound field

- Whether or not to separate signal and noise
  - May emanate simultaneously from a single or stereo speakers
  - May be separated and presented from separate speakers
    - Must specify azimuth
- Must determine relative loudness (S/N)

Due to variations in clinical set-ups, data obtained in sound field in one setting may not translate directly into another similar setting

Hearing in Noise Test (HINT)

- The “gold standard” to evaluate functional hearing skills
- Problems with availability, clinical viability, and cost for set-up

“Personalized” testing

- Some advocate on-the-job testing, using stimuli commonly associated with the job
- This is impossible to standardize and requires a tremendous amount of work as well as cooperation from a number of sources
- How to score or interpret?

Many questions remain unresolved for the future

- Use of hearing aids?
- The speech in noise dilemma
- Use of listening devices, hearing protective devices, and communication equipment